

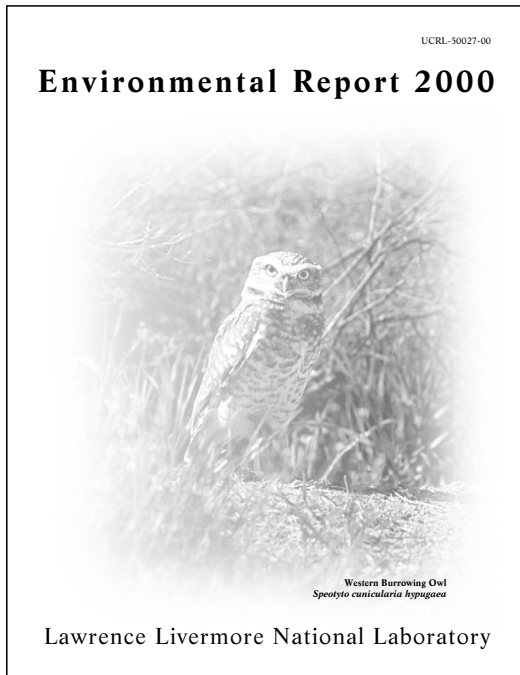
Environmental Community Letter

LAWRENCE LIVERMORE NATIONAL LABORATORY

P.O. Box 808, L-797, Livermore, CA 94551

December 2001

ENVIRONMENTAL REPORT 2000 SHOWS LLNL OPERATIONS POSE NO THREAT TO THE PUBLIC OR ENVIRONMENT



The recently published *Environmental Report 2000* describes the results of LLNL's environmental monitoring and compliance efforts and assesses the impact of operations on the environment for the year 2000. It concludes that radiological doses to the public caused by LLNL operations are less than 0.1% of regulatory standards. This is about 8,000 times smaller than the doses received from natural background radiation by U.S. citizens, on average.

The environmental sampling and analytical results and

evaluations generally show continuing low contaminant levels. This reflects both decreases in historic operations at the Laboratory and its increasing control of pollutants.

Environmental compliance activities in 2000 had significant achievements:

- Livermore site groundwater remediation activities treated more than 1 billion liters of groundwater, which reduced the concentration and length of contaminant plumes migrating westward off site.
- Site 300 environmental remediation activities continue to stop the contaminant plumes from migrating eastward off site; there is no longer an off-site plume of contaminants.
- Sanitary sewer discharges were more than 99% compliant with provisions of the wastewater discharge permit. No sewer releases exceeded discharge limits for radioactive materials.
- The highest median concentration of tritium for samples collected at any air monitoring station in the Livermore Valley was 0.0004% of the federal guideline.

LLNL: WHO WE ARE, WHAT WE DO

Lawrence Livermore National Laboratory (LLNL) is a U.S. Department of Energy (DOE) facility operated by the University of California. It serves as a national resource of scientific, technical, and engineering capabilities. The Laboratory's mission focuses primarily on nuclear weapons and national security but also includes research into areas such as strategic defense, energy, the environment, biomedicine, technology transfer, the economy, and education.

The Laboratory carries out this mission in compliance with local, state, and federal environmental regulatory requirements. It does so with the support of the Environmental Protection Department, which is responsible for environmental monitoring and analysis, hazardous waste management, environmental restoration, and assisting Laboratory organizations in ensuring compliance with environmental laws and regulations.

LLNL comprises two sites: the Livermore site and Site 300. The Livermore site occupies an area of 3.28 square kilometers on the eastern edge of Livermore, California. Site 300, LLNL's experimental testing site, is located 24 kilometers to the east in the Altamont Hills and occupies an area of 30.3 square kilometers. Environmental monitoring activities are conducted at both sites as well as surrounding areas.

SPECIFIC MONITORING ACTIVITIES

Air Monitoring for Plutonium, Tritium, and Other Radionuclides

Air is monitored at various locations on the Livermore site and Site 300, throughout the Livermore Valley, and in the Tracy area. Concentrations of all monitored radionuclides and beryllium at all locations were well below levels that would endanger the environment or public health.

For example, the highest median concentration of plutonium for all sampling locations at both the Livermore site and Site 300 was 0.025% of the federal standard.

Air Effluent Monitoring for Tritium and Radioactive Particulates

Throughout 2000, LLNL operated 76 samplers at six facilities to measure any radioactivity in effluent air generated by Laboratory operations. Radionuclide emissions from all monitored facilities remain very low.

Nonradioactive Air Pollutants

Emissions of nonradioactive hazardous and toxic air pollutants from Laboratory operations in 2000 were low. For example, total nitrogen oxide emission from the Livermore site was approximately 54 kilograms per day. This is about 0.07% of the amount released daily from all sources in the Bay Area. Twenty kilograms of reactive organic compounds were emitted per day. This is approximately 0.02% of the total Bay Area emission of that pollutant.

Approximately 93 kilograms per day of criteria air pollutants (including nitrogen oxides, volatile organics, sulfur oxides, particulate matter, carbon monoxide, and lead) are emitted from the Livermore site and about 3.6 kilograms per day are emitted from Site 300. These releases from the LLNL sites are less than one tenth of one percent of the total daily emissions in the entire Bay Area.

Wastewater Monitoring for Radioactivity and Other Hazardous Materials

The Livermore site discharges almost 1 million liters of wastewater daily to the City of Livermore sewer system (approximately 3.9% of the total flow to the system). The sewage flow from LLNL to the Livermore Water Reclamation Plant (LWRP) is monitored continuously. If any significant releases of radioactivity, metals, or high

or low pH water are detected, the wastewater is redirected to an LLNL sewer diversion system before it leaves the LLNL site. It is then treated and disposed of appropriately.

Water Monitoring for Radionuclides and Other Contaminants

In 2000, the maximum tritium activity measured in on- and off-site drinking water was less than 0.3% of the regulatory maximum contaminant level (MCL). Gross alpha and gross beta radioactivity measurements were also well below regulatory levels of concern.

In the Livermore Valley, no monitored radioactive or inorganic nonradioactive constituent was found to exceed primary drinking water MCLs in any off-site well. In on-site wells, chromium and nitrates have been detected above the primary MCL, but these constituents have not migrated off site at levels above the primary MCLs.

The shallow groundwater beneath Site 300 contains volatile organic compounds (VOCs), tritium, nitrate, Freon, perchlorate, and depleted uranium. These present no current health risks because the shallow groundwater is not used as a source of water supply.

Soil and Sediment Monitoring for Plutonium and Other Radionuclides

In 2000, most of the analyses of on-site soil samples did not detect any nonradiological contaminants labeled as "constituents of concern." A few analyses detected either trace amounts of contaminants or naturally occurring background concentrations. Radiological results were unchanged from previous years. Elevated concentrations of depleted uranium were found near two Site 300 firing tables.

All soil samples taken in the City of Livermore's Big Trees Park in 1998 yielded results well below levels of regulatory concern. A January 2000 report by the Agency for Toxic Substances and Disease Registry (ATSDR) confirmed these results.

The ATSDR report finds that the most credible source of the plutonium in the park is from sewage sludge applied to ornamental trees several decades ago. The source of the plutonium was LLNL releases to the Livermore sanitary sewer in the 1960s.

Vegetation and Foodstuff Monitoring for Tritium

In general, monitoring showed values not significantly different from those for the past few years.

As usual, there was slightly more tritium near the Livermore site than was found at more distant locations. Potential ingestion dose estimates were well below regulatory levels of concern, even when organically bound tritium was taken into account.

GROUNDWATER REMEDIATION

In 2000, treatment facilities at the LLNL Livermore site processed over 1 billion liters of groundwater. Nearly 270 kilograms of VOCs were removed during treatment.

More than 27 kilograms of VOCs were removed from soil and groundwater in five treatment areas at Site 300. These efforts reduced the length of the previously off-site trichloroethylene plume to where it is now inside the site boundary. There is no longer an off-site plume of contamination.

WASTE MINIMIZATION AND POLLUTION PREVENTION

Waste generation at LLNL continues to drop dramatically. There were reductions in three categories: radioactive, hazardous, and sanitary. Mixed waste (radioactive and hazardous waste combined) did not diminish. Total LLNL waste diverted from landfills in 2000 was 26,000 tons. That means the Laboratory recycled 85% of its nonhazardous waste.

RADIOLOGICAL DOSE ASSESSMENT

Every year a theoretical dose to the public is calculated based upon what an individual would receive if he/she lived for a year where the highest radiation dose from releases to the air would occur. For the Livermore site that dose is 0.038 millirem. For Site 300, it is 0.019 millirem. These values are well within the range of those estimated over the past decade and are very small compared with an average radioactive dose of 360 millirem received from all sources, mostly natural background sources. Federal radioactivity exposure standards are highly protective of the public and limit the annual dose an individual can receive. *LLNL has never exceeded the federal standards for the public.*

AIR, WASTEWATER, AND WATER COMPLIANCE

LLNL must meet federal, state, regional, county and local environmental requirements. For example, in 2000, the Bay Area Quality Management District issued or renewed 129 operating permits for the Livermore site. The San Joaquin Valley Air Pollution Control District issued or renewed permits for 42 air emissions sources at Site 300. LLNL has permits for underground and aboveground storage tanks and for discharge of treated groundwater, industrial and sanitary sewage, and storm water. Site 300 has additional permits for inactive landfills, cooling tower discharges, operation of the sewer lagoon, septic tanks, and leach fields. The Laboratory complies with all requirements for self-monitoring and inspections conducted by the regulatory agencies issuing these permits.

ENDANGERED SPECIES

The Laboratory meets the requirements of the U.S. Endangered Species Act and the California Endangered Species Act. In 2000, biological assessments were conducted for 82 Laboratory projects with the potential to disturb special-status species. At Site 300 there were no active San Joaquin kit fox dens but three occupied American badger dens were found. Also, 11 active burrowing owl dens were discovered. The owls were marked for long-term studies. A population of California tiger salamander continued to be monitored. Several rare plant populations were also monitored at Site 300: the large-flowered fiddleneck (*Amsinckia grandiflora*), the big tarplant, the diamond-petaled poppy, and gypsum-loving larkspur. In 2000 the *Amsinckia grandiflora* Reserve was declared a critical habitat area by the Secretary of the U. S. Department of Energy. LLNL has established an experimental population within the Reserve. It is working with the U. S. Fish and Wildlife Service on the continued monitoring of the native and experimental populations.

INTEGRATED SAFETY MANAGEMENT

The Laboratory has an Integrated Safety Management (ISM) System to ensure systematic integration of environment, safety, and health considerations. This allows management and work practices to be accomplished while protecting the public, workers, and the environment. Work Smart Standards are an important part of the ISM System. Safety and environmental professionals identify hazards and establish standards of operation for

continued on page 4

the particular work to be performed. The final set of Work Smart Standards was approved in 1999 and made part of the University of California contract with the U. S. Department of Energy. More than 200 requirements in these standards are directly related to the environment.

ENVIRONMENTAL OCCURRENCES

LLNL reports violations of environmental laws to federal and state agencies. There were nine incidents reported during 2000. None caused impact to human health or to the environment.

CONTRACT PERFORMANCE MEASURES

The University of California's contract with the U. S. Department of Energy includes four performance measures related to environmental protection. These measures are radiation dose to the public, process and solid waste generation, environmental violations, and environmental releases. At the end of 2000, the Department of Energy gave LLNL a score of excellent as an average for these performance measures.

WHY DO A SITE ANNUAL ENVIRONMENTAL REPORT? AND HOW DO I GET ONE?

Each year LLNL is required to produce hundreds of different reports for the agencies in charge of regulating the Laboratory. A few such agencies charged with protecting public health and the environment are the U.S. Environmental Protection Agency, regional air and water boards, and the California Department of Toxic Substances Control.

These agencies, as well as the U.S. Department of Energy (DOE) and the University of California, which manages the Laboratory for DOE, oversee Laboratory operations and monitor any impacts that LLNL operations may have on the public or the environment.

The DOE requires each DOE facility to publish an annual report that summarizes its regulatory compliance status as well as report the results of environmental monitoring done during the year. The *Environmental Report 2000* is the LLNL response to DOE's requirement. (This report is also known as the site annual environmental report, or SAER.) It represents the collection of over 13,000 environmental monitoring samples from the air, water, vegetation, and soil surrounding the Livermore site and Site 300 and the assessment of over 260,000 different characteristics from these samples. Some groundwater samples may be tested to determine the amount of as many as 19 different compounds. All the data collected, collated, and reviewed, and the related modeling, analysis, and conclusions are not only presented annually to regulatory agencies but are also shared with the public through the SAER.

You will find volumes of the 2000 SAER in the LLNL Environmental Repositories at the Livermore and Tracy libraries and the LLNL Visitors Center. The documents are also available on the Web at:

<http://www-envirinfo.llnl.gov/>

This letter features an abbreviated version of the Executive Summary from the 2000 SAER. The complete Executive Summary is available by calling me...



H. F. Heffner
Manager,
Environmental Community Relations
925-424-4026
heffner1@llnl.gov



www-envirinfo.llnl.gov/

Visit this website for information about LLNL environmental news and data, including meeting announcements, public notices, reports, and details of studies.

This work was performed under the auspices of the U.S. Department of Energy by University of California Lawrence Livermore National Laboratory under Contract W-7405-ENG-48.
UCRL-AR-112812-01-1

